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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/320,303	05/26/1999	DONALD AVES	MYAT-204	4516

7590 01/30/2002

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EXAMINER
JONES, HUGH M

ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 01/30/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

AM.

Office Action Summary	Application No. 09/320,303	Applicant(s) Aves
	Examiner Hugh Jones	Art Unit 2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Mar 14, 2001*.

2a) ☐ This action is **FINAL.** 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-20* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *May 26, 1999* is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)

16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)

17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). *2,3*

18) ☐ Interview Summary (PTO-413) Paper No(s). _____

19) ☐ Notice of Informal Patent Application (PTO-152)

20) ☐ Other:

DETAILED ACTION

1. Claims 1-20 of U. S. Application 09/320,303, filed 05/26/1999 are presented for examination.

Drawings

2. **The drawings are objected to under 37 CFR 1.83(a).** The drawings must show every feature of the invention specified in the claims. Applicant has only submitted drawings corresponding to results obtained from the invention. Therefore, the *model* (claims 1-9), *method* (claims 10-18) and *apparatus* (claims 19-20) as claimed must be shown or the feature(s) canceled from the claim(s). The current set of figures only discloses plots of results. No new matter should be entered.

3. **Figures 1-2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated.** See lines 4-5, page 12, specification. See MPEP § 608.02(g).

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. **Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in**

the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification broadly refers to transmission lines. However, the specification does not provide any substantive detail, other than mere reference, to a model, characteristic values, transfer functions, algorithms, distributions, and means for optimization (see claim 1, for example). Applicants also claim "air-spaced transmission line" (claims 5 and 13, for example) but do not disclose such a transmission line in the detailed description of the disclosure.

6. **Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.** The specification broadly refers to transmission lines. However, the specification does not provide any substantive detail, other than mere reference, to a model, characteristic values, transfer functions, algorithms, distributions, and means for optimization (see claim 1, for example). Applicants also claim "air-spaced transmission line" (claims 5 and 13, for example) but do not disclose such a transmission line in the detailed description of the disclosure.

7. Section 2163.02 of the MPEP Standard for Determining Compliance With the Written Description.

"The courts have described the essential question to be addressed in a description requirement issue in a variety of ways. ***An objective standard for determining compliance with the written description requirement is, "does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed."*** In

re Gosteli, 872 F.2d 1008, 1012, 10 USPQ2d 1614, 1618 (Fed. Cir. 1989). Under Vas-Cath, Inc. v. Mahurkar, 935 F.2d 1555, 1563-64, 19 USPQ2d 1111, 1117 (Fed. Cir. 1991), *to satisfy the written description requirement, an applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention, and that the invention, in that context, is whatever is now claimed. The test for sufficiency of support in a parent application is whether the disclosure of the application relied upon* ***"reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter."*** Ralston Purina Co. v. Far-Mar-Co., Inc., 772 F.2d 1570, 1575, 227 USPQ 177, 179 (Fed. Cir. 1985) (quoting In re Kaslow, 707 F.2d 1366, 1375, 217 USPQ 1089, 1096 (Fed. Cir. 1983)).

Whenever the issue arises, the fundamental factual inquiry is whether a claim defines an invention that is clearly conveyed to those skilled in the art at the time the application was filed. The subject matter of the claim need not be described literally (i.e., using the same terms or in haec verba) in order for the disclosure to satisfy the description requirement. If a claim is amended to include subject matter, limitations, or terminology not present in the application as filed, involving a departure from, addition to, or deletion from the disclosure of the application as filed, the examiner should conclude that the claimed subject matter is not described in that application. This conclusion will result in the rejection of the claims affected under 35 U.S.C. 112, first paragraph - description requirement, or denial of the benefit of the filing date of a previously filed application, as appropriate. 220 F.3d 1345, 55 U.S.P.Q.2d (BNA) 1636 (Fed. Cir. 2000)."

8. The 112 rejections for enablement and written description are separate and distinct issues as it relates to the question of incorporation by reference. A rejection based on the enablement requirement of the statute may not be sustainable in this regard since the general incorporation of a U.S. patent by reference in appellant's specification may be sufficient to indicate what is likely to be known by persons of ordinary skill in the art. Cf. In re Howarth, 654 F.2d 103, 210 USPQ 689 (CCPA 1981). ***The issue of compliance with the description requirement, however, is another matter entirely***. In this connection, attention is directed to In re Blaser, 556 F.2d 534,

194 USPQ 122, 125 (CCPA 1977). The function of the description requirement is to ensure that the applicant had possession, as of the filing date of his application, of the specific subject matter later claimed by him. It is required that the specification describe the invention sufficiently for those of ordinary skill in the art to recognize that the applicant invented the subject matter he now claims. In re Smythe, 480 F.2d 1376, 178 USPQ 279, 284 (CCPA 1973). That a person skilled in the art, given the incorporated disclosures, *might* decide to combine the teachings with those explicitly disclosed by Applicants is not a sufficient indication to that person that such is described as a particular feature of appellant's invention. *The doctrine of incorporation by reference is of no avail to applicants in this regard since* ***there is no specific indication in the instant specification of the particular features disclosed by the incorporated references which correspond to those as claimed****; nor does the specification* ***identify the specific portions of the patent*** *which applicant may have intended to rely upon to supplement his disclosure.* The purpose of incorporation by reference in an application of matter elsewhere written down is for economy, amplification, or clarity of exposition, by means of an incorporating statement clearly identifying the subject matter which is incorporated and where it is to be found. In re de Seversky, 474 F.2d 671, 177 USPQ 144, (CCPA 1973).

9. With respect to "means for" claims (see claim 1, for example), see ***Atmel Corp. v. Information Storage Device, Inc.***, 198 F.3d 1374 (Fed. Cir. 1999). In *Atmel*, the Federal Circuit reversed summary judgment that a means-plus-function claim was invalid for indefiniteness because the corresponding structure was in an article that had been incorporated by reference.

Here, the majority explained that the search for corresponding structure should be done from the vantage point of one skilled in the art (i.e., the structure need not be explicit if it would clear to a skilled artisan). *The court went on to say that the structure supporting the means-plus-function element must appear in the specification*. ***A patent may not rely on a document that is incorporated by reference to support structure corresponding to a means-plus-function limitation in a claim. The structure corresponding to the recited function must be described within the four corners of the patent specification***. The court also discussed the use of extrinsic evidence to construe a means-plus-function claim and to find corresponding structures.

10. The Examiner therefore requests a copy of the *computer code* so as to determine what constitutes Applicant's invention at the time of filing.

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claims 8-9, 17-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- "transfer function" (see claims 1 and 3, for example). A transfer function involves two entities (something with respect to something else). The specification does not clarify the meaning of the word.

- "may be defined" (claim 1, limitation c, for example): this is ambiguous.

- "substantially ... distributed across a range" (claims 8-9, similarly for claims 17-18 - for example): this is ambiguous.

- "Apparatus" claims 19-20 do not further limit the independent "method" claim. It is recommended that the phrase "A segmented transmission line, produced according ..." be replaced with "The method of claim ##, wherein the segmented transmission line..."

13. Claims 10-18 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. Applicants have not claimed the details which are necessary for carrying out the optimization.

14. Claims 1-9 and 19-20 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. Applicants have not claimed the elements which are necessary for carrying out the optimization.

Claim Interpretation

15. The broadest reasonable interpretation has been given to the claims. Applicants refer to a number of features in the claims which have not been discussed in any substantive detail in the specification. The Examiner will provide the best interpretation, based on the specification, for purposes of prior art rejections.

- *transfer function*: this is not discussed in the "detailed description" of the specification. There is discussion of *s-parameter matrix* methods (page 7, line 20 to page 8, line 10. However, *S-parameter analysis* is only *one type* of transfer function analysis. For purposes of a prior art rejection, "transfer function" is interpreted to be any transfer function as discussed in the prior art as it relates to transmission lines - until such time as "s-parameter" is claimed.

- Applicants also claim "air-spaced transmission line" (claims 5 and 13, for example) but do not disclose such a transmission line in the detailed description of the disclosure. The Examiner threfore interprets that this refers to "intended use" and does not give patentable weight to "air-spaced". The Examiner also notes lines 13-18, page 7 of the specification.

16. Claims 1-9 have been interpreted in view of 35 U.S.C. 112, and *In re Donaldson*, 16 F.3d 1189, 29 USPQ2d 1845 (Fed. Cir. 1994). Reciting the pertinent section of 35 U.S.C. 112, paragraph six:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

17. With respect to the "means for" claims (claims 1-9), it is interpreted that the structure corresponding to the recited functions is only that which is described within the four corners of the patent specification.

Claim Rejections - 35 USC § 102

18. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

19. Claims 10-11 and 13-20 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Fleming-Dahl (F: U. S. Patent 5,218,326 - of record).

20. ***Fleming-Dahl*** discloses a ***method of defining component lengths, especially cable lengths, in a radio frequency or microwave system so as to minimize in-phase coupling of voltage reflections in the system involves the use of prime roots of prime numbers as scaling factors which are multiplied with a minimum component length to obtain a list of potential component lengths. The scaled potential component lengths are then screened for accidental relationships with component lengths obtained using lower order roots in order to prevent accidental harmonic relationships from arising in the system***, and the resulting screened list is evaluated to ensure that the remaining potential component lengths meet such system requirements as available spans, minimum and maximum component lengths, number of lengths required, and ***matched Insertion Loss requirements***. In order to screen the scaled potential component lengths, windows are constructed around the potential lengths based on component ***manufacturing tolerances***, and subsequently adjusted as necessary.

21. The claims are recited and the correspondence to the prior art is noted.

- **Claim 10** pertains to a method for optimizing the segment characteristics of a segmented transmission line, comprising the steps of modeling the electrical performance of the segmented transmission line, evaluating the model for electrical performance **(F: col. 1, line 31 to col. 2, line 17; col. 2, lines 41-54; col. 3, lines 10-20; col. 4, lines 14-32)**, and selecting a set of segment characteristics **(F: abstract; figures 1-7; col. 2, line 66 to col. 4, line 20; col. 4, line 52 to col. 6, line 19; col. 7, lines 23-61)**, based on the evaluation, which meets a set of predefined optimization criteria **(F: abstract; col. 1, line 31 to col. 2, line 17; col. 2, lines 41-54; col. 3, lines 10-20; col. 4, lines 14-32).**

- **Claim 11** pertains to the method according to claim 10, wherein the set of segment characteristics comprises a respective length of each segment **(F: abstract; figures 1-7; col. 2, line 66 to col. 4, line 20; col. 4, line 52 to col. 6, line 19; col. 7, lines 23-61)**.

- **Claim 13** pertains to the method according to claim 10, wherein the segmented transmission line comprises an air-spaced coaxial transmission line adapted for transmitting an RF signal, the predefined optimization criteria comprising signal transmission efficiency **(F: abstract; col. 1, lines 10-13, col. 2, lines 18-30;)**.

- **Claim 14** pertains to the method according to claim 10, wherein a precision of the evaluation exceeds a manufacturing tolerance of the segmented transmission line **(F: abstract; figure 1; col. 3, line 64 to col. 4, line 11; col. 6, lines 35-49; col. 6, line 64 to col. 7, line 7; col. 7, line 62 to col. 8, line 20)**.

- **Claim 15** pertains to the method according to claim 10, further comprising outputting a predicted performance of the segmented transmission line based on the respective segment characteristics **(F: abstract; fig. 1-7; col. 1, line 31 to col. 2, line 17; col. 2, lines 41-54; col. 3, lines 10-20; col. 4, lines 14-32).**

- **Claim 16** pertains to the method according to claim 10, further comprising the step of producing a set of transmission line segments according to the selected segment characteristics **(F: abstract; figures 1-7; col. 2, line 66 to col. 4, line 20; col. 4, line 52 to col. 6, line 19; col. 7, lines 23-61)**.

- **Claim 17** pertains to the method according to claim 10, wherein a variation in respective segment characteristics is distributed substantially non-incrementally **(F: abstract; figures 1-7; col. 2, line 66 to col. 4, line 20; col. 4, line 52 to col. 6, line 19; col. 7, lines 23-61)**.

- **Claim 18** pertains to the method according to claim 10, wherein a variation in respective segment characteristics is distributed substantially non-monotonically **(F: abstract; figures 1-7; col. 2, line 66 to col. 4, line 20; col. 4, line 52 to col. 6, line 19; col. 7, lines 23-61)**.

- **Claim 19** pertains to a segmented transmission line, produced according to claim 16, wherein the segment characteristic comprises a respective segment length and the optimization criteria comprises a minimization of worst case VSWR over a radio frequency band **(F: col. 1, line 31 to col. 2, line 17; col. 2, lines 41-54; col. 3, lines 10-20; col. 4, lines 14-32).**

- **Claim 20** pertains to a segmented transmission line, produced according to claim 16, wherein the segmented transmission line comprises an air-spaced coaxial transmission line adapted for transmitting an RF signal **(col. 1, lines 10-13, col. 2, lines 18-30)**; the segment characteristic comprises a respective segment length **(F: abstract; figures 1-7; col. 2, line 66 to col. 4, line 20; col. 4, line 52 to col. 6, line 19; col. 7, lines 23-61)** and the optimization criteria comprises a minimization of worst case VSWR over a radio frequency band **(F: col. 1, line 31 to col. 2, line 17; col. 2, lines 41-54; col. 3, lines 10-20; col. 4, lines 14-32).**

Claim Rejections - 35 USC § 103

22. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

23. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

24. The prior art will be applied and analyzed as per the Graham Deere Inquiries. The claims will then be recited and the correspondence to the prior art noted.

25. **Claims 1-9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over [Fleming-Dahl "F" (U. S. Patent 5,218,326 - of record) in view of Huss "H"].**

26. ***Fleming-Dahl*** discloses a ***method of defining component lengths, especially cable lengths, in a radio frequency or microwave system so as to minimize in-phase coupling of voltage reflections in the system involves the use of prime roots of prime numbers as scaling factors which are multiplied with a minimum component length to obtain a list of potential component lengths. The scaled potential component lengths are then screened for accidental relationships with component lengths obtained using lower order roots in order to prevent accidental harmonic relationships from arising in the system***, and the resulting screened list is evaluated to ensure that the remaining potential component lengths meet such system requirements as available spans, minimum and maximum component lengths, number of lengths required, and ***matched Insertion Loss requirements***. In order to screen the scaled potential

component lengths, windows are constructed around the potential lengths based on ***component manufacturing tolerances***, and subsequently adjusted as necessary.

27. Transfer functions are inherent in the analysis and characterization of transmission lines. However, Fleming-Dahl does not explicitly teach transfer functions.

28. ***Huss*** discloses "*A mathematical and lumped-element model for multiple cascaded lossy transmission lines with arbitrary impedances and discontinuities.*" Huss further discloses a mathematical and lumped-element model for multiple cascaded lossy transmission lines with arbitrary impedances and discontinuities is presented. The mathematical model is developed using the ***ABCD matrix representation of a two-port network***. The lumped element model uses pole-zero approximations to ***cable transfer functions***.

29. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teaching of Fleming-Dahl with the teaching of Huss for the following reasons:

- Huss discloses (section II, page 1844) that "*There are several methods for describing a 2-port network. The most common method is to use S-parameters. However, for cascaded netwroks, the ABCD matrix is preferred...*". Note that a transmission line is a two-port and is considered as such during analysis and simulation of transmission lines.

30. The claims are recited and the correspondence to the prior art is noted.

- **Claim 1** pertains to a computer model for describing a performance of a segmented transmission line having a plurality of segments, each segment having a transfer function, comprising:

(a) means for storing at least one characteristic value the transfer function of a respective segment of the segmented transmission line **(H: abstract; sections II-III; section V, pg. 1847)**;

(b) means for storing information relating to at least one algorithm, said algorithm being for determining the effect of a respective characteristic value and sequence of transmission line segments on a performance of the overall segmented transmission line **(F: abstract; figures 1-7; col. 2, line 66 to col. 4, line 20; col. 4, line 52 to col. 6, line 19; col. 7, lines 23-61)**; and

(c) means for adjusting a characteristic value **(F: abstract; figures 1-7; col. 2, line 66 to col. 4, line 20; col. 4, line 52 to col. 6, line 19; col. 7, lines 23-61)**,

whereby a set of characteristic values may be defined for respective transmission line segments **(F: abstract; figures 1-7; col. 2, line 66 to col. 4, line 20; col. 4, line 52 to col. 6, line 19; col. 7, lines 23-61)**, having an optimized performance in view of the at least one algorithm **(F: col. 1, line 31 to col. 2, line 17; col. 2, lines 41-54; col. 3, lines 10-20; col. 4, lines 14-32).**

Claim 2 pertains to the model according to claim 1, wherein the characteristic value is a length of a respective transmission line segment **(F: abstract; figures 1-7; col. 2, line 66 to col. 4, line 20; col. 4, line 52 to col. 6, line 19; col. 7, lines 23-61)**.

Claim 3 pertains to the model according to claim 1, wherein the at least one algorithm calculates a transfer function of the segmented transmission line **(H: abstract; sections II-III; section V, pg. 1847)**.

Claim 4 pertains to the model according to claim 1, wherein the adjusting means allows adjustment of all characteristic values, the adjustments being based on a determined performance of the segmented transmission line **(F: abstract; figs. 1-7; col. 1, line 31 to col. 2, line 17; col. 2, lines 41-54; col. 3, lines 10-20; col. 4, lines 14-32; col. 4, line 52 to col. 6, line 19; col. 7, lines 23-61).**

Claim 5 pertains to the model according to claim 1, wherein the segmented transmission line comprises an air-spaced coaxial transmission line adapted for transmitting an RF signal, the performance comprising signal transmission efficiency **(F: col. 1, line 31 to col. 2, line 17; col. 2, lines 41-54; col. 3, lines 10-20; col. 4, lines 14-32)**.

Claim 6 pertains to the model according to claim 1, wherein a precision of the algorithm exceeds a manufacturing tolerance of the segmented transmission line **(F: abstract; figure 1; col. 3, line 64 to col. 4, line 11; col. 6, lines 35-49; col. 6, line 64 to col. 7, line 7; col. 7, line 62 to col. 8, line 20)**.

Claim 7 pertains to the model according to claim 1, further comprising means for outputting a predicted performance of the segmented transmission line based on the respective characteristic values **(F: abstract; figs. 1-7; col. 1, line 31 to col. 2, line 17; col. 2, lines 41-54; col. 3, lines 10-20; col. 4, lines 14-32).**

Claim 8 pertains to the model according to claim 1, wherein the respective characteristic values are substantially non-incrementally distributed across a range **(F: abstract; figures 1-7; col. 2, line 66 to col. 4, line 20; col. 4, line 52 to col. 6, line 19; col. 7, lines 23-61)**.

Claim 9 pertains to the model according to claim 1, wherein the respective characteristic values are substantially non-monotonically distributed across a range **(F: abstract; figures 1-7; col. 2, line 66 to col. 4, line 20; col. 4, line 52 to col. 6, line 19; col. 7, lines 23-61)**.

Claim 12 pertains to the method according to claim 10, wherein the model is evaluated to determine a transfer function of the segmented transmission line **(H: abstract; sections II-III; section V, pg. 1847)**.

Conclusion

31. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- ***Fleming-Dahl*** **(U. S. Patent 5,436,846 - of record)** discloses a method of facilitating construction of a microwave system which permits the evaluation of a variety of hardware construction options and subsequent evaluation of their effectiveness by measuring or otherwise determining appropriate physical parameters of selected components arranged in a selected order

to predict the power response uses an iterative ladder network constructed according to a point discontinuity model for individual components of the system in which input and output reflection coefficients and an attenuation coefficient are calculated for each component based on measured or specified insertion loss and VSWR or return loss values, and the ladder is analyzed by processing the coefficients forward in the direction of power flow.

- ***Celik et al.*** disclose a new all-purpose multiconductor transmission-line model for efficient and robust interconnect simulation using nonlinear circuit simulators such as SPICE. All types of interconnects, i.e., uniform, nonuniform, lossless, lossy/dispersive, can be handled by the proposed model. Furthermore, coupling of electromagnetic radiation to interconnects can be directly modeled without the need for developing a new subcircuit. Another advantage of the proposed model is that it enables sensitivity analysis with respect to both circuit and interconnect parameters, thus facilitating interconnect circuit optimization. Chebyshev expansions for the spatial variations of the interconnect voltages and currents are used to effect highly accurate numerical approximations of the Telegrapher's equations using as small a number of degrees of freedom as possible. A simple rule of thumb is provided for the selection of the order of the approximation given the frequency bandwidth of interest. Numerical examples are presented to demonstrate the validity of the proposed model and illustrate its application to a variety of interconnect-induced noise interactions in high-speed electronic systems.

- ***Ostertag*** **(of record)** discloses a rigid, coaxial transmission line is provided which includes a plurality of sections joined by connector assemblies. The transmission line includes a

plurality of ordered groups. Each of the ordered groups includes a plurality of equal-length sections. The length of the equal-length sections in each ordered group is selected to reduce the VSWR spikes caused by the connector assemblies. The length of the equal-length sections progressively changes between each of the ordered groups.

- ***Kozuch*** **(of record)** discloses a system for determining the magnitude or value of the VSWR of an RF transmission system is disclosed. A VSWR value is preselected, and the ratio of reflected voltage to forward voltage for the system for a preselected VSWR is determined. The ratio is multiplied by the absolute value of the measured instantaneous forward RF voltage, giving a predicted value for the actual reflected voltage. The reflected voltage is measured, and the predicted and actual values are compared. The actual VSWR bears the same relationship to the predetermined VSWR that the actual reflected voltage bears to the predicted reflected voltage. To determine the actual value of the VSWR, a counter which contains the preselected VSWR value is incremented or decremented as a result of the comparison until the difference changes sign. The predetermined VSWR employed for the final comparison, which value is still stored in the counter, is sent to the display circuit, as the actual VSWR. Various apparatus means, such as a microprocessor, digital-to-analog multiplying converter, and analog sensors are also disclosed

- ***Wentworth*** discloses a system and a method for determining the impedance of a given microwave device by measuring the standing wave in a transmission line is disclosed. A section of transmission line having a plurality of field-sensing probes therein is disposed between an RF signal source and the device. The output signals of these probes are sampled by the system, and

the device impedance in terms of the reflection coefficient and the standing wave ratio are calculated using a mathematical process and a digital computer. The frequency of the RF source is variable permitting the measurements to be made over a predetermined frequency range.

- ***Stopper*** discloses a method and apparatus for optimizing the signal transmission speed between a signal source and a signal receiver of a microelectronic circuit is disclosed. The method includes the step of providing a signal transmission path whose length provides a predetermined ratio between its resistance and characteristic impedance which will reproduce the transmitted signal at the receiving end upon the first signal transition. The length of this transmission path may be increased by using a nonhomogeneous line structure in which the characteristic impedance increases in the direction of the signal transmission. In one form of the invention, the signal transmission path is formed by interconnecting a plurality of micro-strip conductors disposed on different planes of a universally programmable silicon circuit board. Under the appropriate circumstances, a signal can travel through such a "semi-lossy" transmission path at approximately the speed of light.

- ***Winkelstein*** discloses a technique to describe a complex coupled multi-port transmission line system in terms of a time-domain Green's function and then implement this description into a circuit simulator. This permits highly accurate simulation of arbitrary transmission line networks with non-linear transistor level models of digital devices and avoids reliance on non-physical approximations of the behavior of the transmission line or digital device

termination. The method is particularly applicable to digital systems which experience transmission line effects of printed circuit board tracks.

- ***Banning*** **(of record)** discloses a coaxial transmission line for u.h.f. waves, and particularly for use with slotted line equipment, in which the center conductor is supported coaxially within the outer conductor by spaced dielectric pins extending radially between said conductors, wherein wave reflections are minimized by means of counter-bored areas in the form of shallow depressions in the surface of the inner conductor where it is engaged by said pins, said depressions completely

surrounding the point of engagement of each pin with said inner conductor and being dimensioned to produce an inductive effect to compensate for the capacitive effect of the dielectric pins.

- ***Barford et al.*** discloses a method and apparatus for using frequency domain data, such as S-parameters, in a time-based simulator. S-parameters are either input to the simulator, or are empirically measured, at selected frequencies. Preferably, the selected frequencies are related to one another by a logarithmic scale, providing for determination of a system transfer function which is accurate across a very wide range of frequencies, from near zero hertz, to frequencies on the order of a hundred gigahertz. The transfer function preferably takes the form of a fitted polynomial, obtained using FDSI techniques. In addition, recursive convolution may be employed to operate in the time domain on inverse Laplace Transforms of the fitted transfer function and time-domain simulator test signals. This disclosure provides for circuit modeling and simulation

which is accurate across a wide frequency range, which is stable for transfer functions of high order, and which is quickly and efficiently performed for large circuits.

28. Any inquiry concerning this communication or earlier communications from the examiner should be:

directed to:

Dr. Hugh Jones telephone number (703) 305-0023, Monday-Thursday 0830 to 0700 ET, ***or*** the examiner's supervisor, Kevin Teska, telephone number (703) 305-9704. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, telephone number (703) 305-3900.

mailed to:

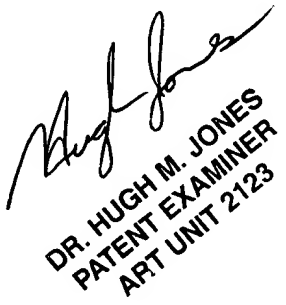
Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 308-9051 (for formal communications intended for entry)

or (703) 308-1396 (for informal or draft communications, please label "*PROPOSED*" or "*DRAFT*").



Dr. Hugh Jones

October 2, 2001